6-17-1967

Test 963: Massey-Ferguson MF 1100 (Gasoline)

Tractor Museum
University of Nebraska-Lincoln, TractorMuseumArchives@unl.edu

NEBRASKA TRACTOR TEST 963 – MASSEY-FERGUSON MF 1100 GASOLINE

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Hp-hr per gal	Temperature Degrees F: Cooling medium	Temperature Degrees F: Air wet bulb	Temperature Degrees F: Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours								
90.29	2200	8.251	0.561	10.94	176	64	75	29.030
Standard Power Take-off Speed (1000 rpm)—One Hour								
83.62	2001	7.565	0.555	11.05	177	67	75	28.795
VARYING POWER AND FUEL CONSUMPTION—TWO HOURS								
79.20	2294	8.010	0.620	9.89	170	67	75	.....
0.00	2472	3.242	.....	.....	158	64	73	.....
41.28	2391	5.756	0.856	7.17	164	68	74	.....
88.47	2202	8.274	0.574	10.69	178	69	76	.....
21.04	2421	4.460	1.300	4.72	163	69	75	.....
61.07	2353	7.066	0.710	8.64	168	66	75	.....
Av 48.51	**2356**	**6.134**	**0.776**	**7.91**	**167**	**67**	**74**	**28.793**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Slip of drivers %	Fuel Consumption: Gal per hr	Fuel Consumption: Lb per hp-hr	Hp-hr per gal	Temp Degrees F: Cool-ing med	Temp Degrees F: Air wet bulb	Temp Degrees F: Air dry bulb	Barom-eter inches of Mercury
VARYING DRAWBAR AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours—5th Gear (3rd Lo-Lo MP)											
73.92	6808	4.07	2201	8.86	8.256	0.685	8.95	172	73	78	28.820
75% of Pull at Maximum Power—Ten Hours—5th Gear (3rd Lo-Lo MP)											
62.26	5290	4.41	2322	6.43	7.763	0.765	8.02	168	69	77	28.822
50% of Pull at Maximum Power—Two Hours—5th Gear (3rd Lo-Lo MP)											
43.67	3551	4.61	2374	4.41	6.619	0.930	6.60	165	76	85	28.785
MAXIMUM POWER WITH BALLAST											
62.71	10184	2.31	2282	14.48	2nd Gear (1st Lo-Hi MP)			174	75	90	28.740
71.92	9672	2.79	2204	14.48	3rd Gear (2nd Lo-Lo MP)			171	68	80	28.960
73.73	7452	3.71	2201	9.84	4th Gear (2nd Lo-Hi MP)			174	68	80	28.960
76.28	7051	4.06	2200	9.25	5th Gear (3rd Lo-Lo MP)			173	70	82	28.940
73.14	5204	5.27	2200	6.36	6th Gear (3rd Lo-Hi MP)			169	60	72	29.030
75.09	5055	5.57	2201	6.22	7th Gear (1st Hi-Lo MP)			172	70	83	28.940
73.67	3885	7.11	2196	4.80	8th Gear (1st Hi-Hi MP)			176	70	83	28.940
73.86	3081	8.99	2198	4.01	9th Gear (2nd Hi-Lo MP)			173	70	83	28.940
68.87	2250	11.48	2202	2.67	10th Gear (2nd Hi-Hi MP)			170	70	83	28.940
71.64	2149	12.50	2200	2.52	11th Gear (3rd Hi-Lo MP)			172	70	83	28.940
MAXIMUM PULL WITHOUT BALLAST											
69.41	7309	3.56	2232	14.98	4th Gear (2nd Lo-Hi MP)			173	62	78	29.000

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST—5th Gear (3rd Lo-Lo MP)

Pounds pull	7051	7240	7496	7525	7587	7368
Horsepower	76.28	70.23	64.17	56.19	48.35	39.27
Crankshaft speed, rpm	2200	1979	1755	1532	1310	1091
Miles per hour	4.06	3.64	3.21	2.80	2.39	2.00
Slip of drivers, %	9.25	9.45	9.96	10.09	10.09	9.84

TIRES, BALLAST and WEIGHT		**With Ballast**	**Without Ballast**
Rear tires	—No, size, ply & psi	Two 18.4-34; 8; 18	Two 18.4-34; 8; 16
Ballast	—Liquid	939 lb each	None
	Cast iron	1096 lb each	None
Front tires	—No, size, ply & psi	Two 7.50-18; 6; 36	Two 7.50-18; 6; 28
Ballast	—Liquid	None	None
	Cast iron	68 lb each	None
Height of drawbar		24 inches	25 inches
Static weight with operator—Rear		10460 lb	6390 lb
Front		3000 lb	2865 lb
Total		13460 lb	9255 lb

Department of Agricultural Engineering

Dates of Test: June 17 to July 6, 1967

Manufacturer: MASSEY-FERGUSON, INC. DETROIT, MICHIGAN

FUEL, OIL and TIME **Fuel** regular gasoline **Octane No** Motor 84.8 Research 92.5 (rating taken from oil company's typical inspectoin data) **Specific gravity converted to 60°/60°** 0.732 **Weight per gallon** 6.135 lb **Oil** SAE 20-20W **API service classification** MS DM **To motor** 1.930 gal **Drained from motor** 1.479 gal **Transmission and final-drive lubricant** SAE Massey-Ferguson Oil M-1127 **Total time engine was operated** 70 hours.

ENGINE **Make** Waukesha **Type** gasoline 6 cylinder vertical **Serial No** 120052 **Crankshaft mounted** lengthwise **Rated rpm** 2200 **Bore and stroke** 4⅛" x 4" **Compression ratio** 8 to 1 **Dislacement** 320 cu in **Carburetor size** 1½" **Ignition system** battery **Cranking system** 12 volt electric **Lubrication** pressure **Air cleaner** dry pleated paper element, centrifugal precleaner **Oil filter** full flow replaceable element **Oil cooler** engine coolant heat exchanger for crankcase oil and radiator for transmission and hydraulic oil **Fuel filter** sediment bowl with screen **Muffler** was used **Cooling medium temperature control** thermostat.

CHASSIS **Type** Standard **Serial No** 9BI0537 **Tread width** rear 60" to 96" front 56" to 88" **Wheel base** 102.06" **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from centerline of rear wheels 30.6" Vertical distance above roadway 36.0" Horizontal distance from center of rear wheel tread 0" to the right/left **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with partial range operator controlled power shifting **Advertised speeds mph** first 2.00 second 2.52 third 3.16 fourth 3.98 fifth 4.34 sixth 5.46 seventh 5.76 eighth 7.26 ninth 9.09 tenth 11.45 eleventh 12.46 twelfth 15.70 reverse first 1.63 second 2.06 third 4.71 fourth 5.94 **Clutch** single plate dry disc **Brakes** double disc hydraulic power actuated operated by two foot pedals which can be locked together **Steering** hydraulic with power assist **Turning radius** (on concrete surface with brake applied) right 140" left 140" (on concrete surface without brake) right 164 left 164" **Turning space diameter** (on concrete surface with brake applied) right 290" left 290" (on concrete surface without brake) right 328" left 328" **Belt pulley** none **Power take-off** 540 or 1000 rpm at 2000 engine rpm.

REPAIRS and ADJUSTMENTS During preliminary PTO runs it was necessary to provide additional support to governor linkage to prevent governor hunting.

REMARKS All test results were determined from observed data obtained in accordance with the SAE and ASAE test code.

First gear was not run as it was necessary to limit the pull in second gear to avoid excessive wheel slippage. Twelfth gear was not run as it exceeded 15 mph.

We, the undersigned, certify that this is a true and correct report of official Tractor Test 963.

L. F. LARSEN
Engineer-in-Charge

G. W. STEINBRUEGGE, Chairman
J. J. SULEK
D. E. LANE
Board of Tractor Test Engineers

The University of Nebraska Agricultural Experiment Station
E. F. Frolik, Dean; H. W. Ottoson, Director; Lincoln, Nebraska

EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories can be disconnected only when it is convenient for the operator to do so in practice. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. The tire tread-bar height must be at least 65% of new tread height prior to the maximum power run.

BELT OR POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the belt pulley or the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general usage.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests. If the manufacturer specifies a different rated crankshaft speed for drawbar operations, then the position of the manually operated governor control is changed to provide the high-idle speed specified by the manufacturer in the operating instructions.

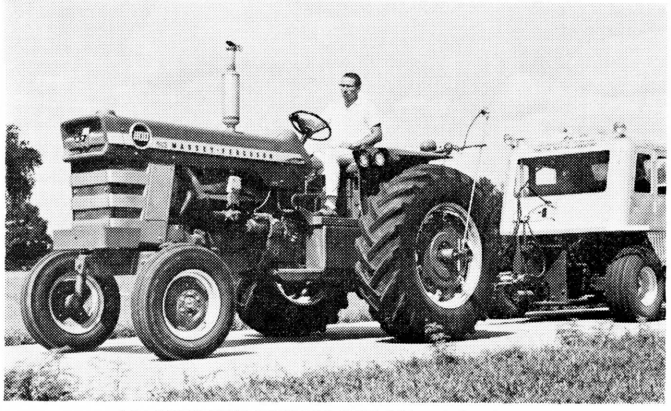
Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effect of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 3 different levels as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; and (3) 50% of the pull at maximum power. Prior to 1958, fuel consumption data (10 hour test) were shown only for the pull obtained at maximum power for tractors having torque converters and at 75% of the pull obtained at maximum power for gear-type tractors.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 12 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe-limit for the test course. The maximum safe speed for the Nebraska Test Course has been set at 15 miles per hour. The slippage limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Maximum Pull without Ballast. All added ballast is removed from the tractor. The drawbar pull is determined at slip limits of 15% for pneumatic tires or 7% for steel tracks or lugs. The tractor is operated at the fastest possible travel speed.

Varying Power and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska.**



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